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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/669,242	09/24/2003	Leonard G. Marianowski	IGT-1501	3526

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EXAMINER

CHUO, TONY SHENG HSIANG

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 08/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/669,242

Applicant(s)

MARIANOWSKI, LEONARD G.

Examiner

Tony Chuo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>9/24/03, 2/17/04, 12/12/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statements (IDS) submitted on 9/24/03, 2/17/04, and 12/12/05 were filed on 9/24/03, 2/17/04, 12/12/05. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

Drawings

2. The drawings filed on 9/24/03 are accepted by the examiner.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 8 recites the limitations "said cathode electrode facing side", "said anode electrode facing side", "said anode electrode facing sides", and "said cathode electrode facing sides" in lines 36-39, 44, and 49. There is insufficient antecedent basis for these limitations in the claim.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-4 and 6-7 are rejected under 35 U.S.C. 102(e) as being anticipated by Allen (US 6777126). Regarding claim 1, the Allen reference teaches a fuel cell bipolar separator plate constructed of two sheet metal plates, main bodies “30A” & “30B”, having a substantially flat peripheral region and a central region comprising a plurality of substantially uniform corrugations wherein the first sheet metal plate and the second sheet metal plate have substantially equal peak-to-peak distances and a peak-to-valley distance of the first sheet metal plate that is greater than the second sheet metal plate. In addition, it also teaches sheet metal plates that are aligned whereby each corrugation valley of each corrugation of the first sheet metal plate contacts a corresponding corrugation valley of the second sheet metal plate to form a coolant flow channel, center chamber “210”, between each corrugation peak of the corrugations of the first sheet metal plate and the corresponding corrugation peak of the corrugations of the second sheet metal plate (See Figure 24 and 26, column 7 lines 45-47, column 15 lines 26-36 and lines 54-58). Examiner’s note: The preamble of claim 1 is a Jeppson claim preamble so therefore it is an admission of prior art.

Regarding claims 2 and 4, it also teaches various fuel cell types including MOFC, SOFC, phosphoric acid fuel cell, and PEMFC (See column 2, lines 47-60 and column 8, lines 35-42).

Regarding claim 3, it also teaches a metallic separator that may consists of two separate sheets of material of an alloy of nickel or stainless steel, or an alloy with coatings that inhibit the transfer of metallic ions to the membrane (See column 8 lines 28-42).

Regarding claim 6, it also teaches a plurality of internal manifolds "211", "212" & "213" for supplying fuel and oxidant to each of the fuel cell units and for removal of exhaust gases therefrom and for providing coolant to coolant flow channels (See Figure 26, column 15 lines 54-63).

Regarding claim 7, it also teaches corrugation valleys that have an arcuate profile (See Figure 24).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Allen (US 6777126) in view of Akikusa et al (JP 2002-280007). The Allen reference is applied to claims 1-4 and 6-7 for reasons stated above. However, it does not expressly teach at least two sheet metal elements that are constructed of a chromium-nickel austenitic alloy comprising on a combined basis at least about 50% by weight chromium and nickel. The Akikusa reference teaches a fuel cell separator "33" that is constructed of

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nickel radical alloy or chromium radical alloy such as Inconel 600 which is a chromium-nickel alloy comprising 72% nickel and 14 to 17% chromium (See paragraph [0029] and Inconel 600 Technical Data). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Allen bipolar separator to include at least two sheet metal elements that are constructed of a chromium-nickel austenitic alloy comprising on a combined basis at least about 50% by weight chromium and nickel in order to provide a high temperature alloy that has an excellent combination of high strength, hot and cold workability, and resistance to corrosion so that it is able to withstand the corrosive environment of a high temperature fuel cell.

9. Claims 8-12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allen (US 6777126) in view of Marianowski et al (US 4963442). Regarding claim 8, the Allen reference teaches a fuel cell bipolar separator plate constructed of two sheet metal plates, main bodies "30A" & "30B", having a substantially flat peripheral region and a central region comprising a plurality of substantially uniform corrugations wherein the first sheet metal plate and the second sheet metal plate have substantially equal peak-to-peak distances and a peak-to-valley distance of the first sheet metal plate that is greater than the second sheet metal plate and sheet metal plates that are aligned whereby each corrugation valley of each corrugation of the first sheet metal plate contacts a corresponding corrugation valley of the second sheet metal plate to form a coolant flow channel, center chamber "210", between each corrugation peak of the corrugations of the first sheet metal plate and the corresponding corrugation peak of the corrugations of the second sheet metal plate; and separator plates having a flattened

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flare to seal the cathode manifold area to the main body of the separator (See Figure 15, 24 and 26-29, column 7 lines 45-47, column 11 lines 65-67, column 15 lines 26-36 and lines 54-58). Examiner's note: The preamble of claim 8 is a Jeppson claim preamble so therefore it is an admission of prior art. Regarding claim 9, it also teaches a plurality of coolant fluid openings "211" in the separator plates being surrounded by a flattened coolant fluid manifold seal structure to form a coolant fluid manifold seal under cell operating conditions. Examiner's note: It is implicit that when the separator taught by Allen is assembled to form a fuel cell stack, the coolant fluid manifold seal structure will extend to contact the electrolyte electrode assemblies on the anode electrode facing sides and the cathode electrode facing sides of the separator plates to form a plurality of coolant fluid manifolds extending through the fuel cell stack. Regarding claims 10 and 12, it also teaches various fuel cell types including MOFC, SOFC, phosphoric acid fuel cell, and PEMFC (See column 2, lines 47-60 and column 8, lines 35-42). Regarding claim 11, it also teaches a metallic separator that may consists of two separate sheets of material of an alloy of nickel or stainless steel, or an alloy with coatings that inhibit the transfer of metallic ions to the membrane (See column 8 lines 28-42). Regarding claim 14, it also teaches corrugation valleys that have an arcuate profile (See Figure 24). However, it does not expressly teach separator plates each having a plurality of aligned perforations where the perforations are surrounded on the anode electrode facing face and the cathode electrode facing side by a flattened manifold seal structure extending to contact one of electrolyte electrode assemblies and current collectors on the anode electrode facing sides and cathode electrode facing

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sides of the separator plates, forming a manifold seal under cell operating conditions to form a plurality of fuel gas and oxidant gas manifolds extending through the cell stack; fuel conduits through the flattened manifold seal structure providing fuel gas communication between the fuel gas manifolds and anode chambers on anode electrode facing side of separator plates, thereby providing fully internal manifolding of fuel to and from each fuel cell unit in the fuel cell stack; and oxidant conduits through the flattened manifold seal structure providing oxidant gas communication between the oxidant gas manifolds and cathode chambers on cathode electrode facing side of separator plates, thereby providing fully internal manifolding of oxidant to and from each fuel cell unit in the fuel cell stack. The Marianowski reference teaches electrolytes and separator plates that each have an aligned perforation in each corner area where each separator plate perforation being surrounded by a flattened manifold wet seal structure extending to contact the electrolytes on each side of the separator plates forming a separator plate/electrolyte wet seal under cell operating conditions to form a gas manifold in each corner area extending through the cell stack. It also teaches conduits through the extended manifold wet seal structure that provide gas communication between one of the manifolds at each end of the separator plates and the anode chambers on one side of the separator plates and conduits through the extended manifold wet seal structure that provide gas communications between the other of the manifolds at each end of the separator plates and the cathode chambers on the other side of the separator plates. It also teaches a structure that provides fully internal manifolding of fuel and oxidant gases to each of the unit fuel cells in the fuel cell stack

(See column 3, lines 36-54). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Allen bipolar separator to include separator plates each having a plurality of aligned perforations where the perforations are surrounded on the anode electrode facing face and the cathode electrode facing side by a flattened manifold seal structure extending to contact one of electrolyte electrode assemblies and current collectors on the anode electrode facing sides and cathode electrode facing sides of the separator plates, forming a manifold seal under cell operating conditions to form a plurality of fuel gas and oxidant gas manifolds extending through the cell stack; fuel conduits through the flattened manifold seal structure providing fuel gas communication between the fuel gas manifolds and anode chambers on anode electrode facing side of separator plates, thereby providing fully internal manifolding of fuel to and from each fuel cell unit in the fuel cell stack; and oxidant conduits through the flattened manifold seal structure providing oxidant gas communication between the oxidant gas manifolds and cathode chambers on cathode electrode facing side of separator plates, thereby providing fully internal manifolding of oxidant to and from each fuel cell unit in the fuel cell stack in order to provide assured sealing of one gas conduit from the adjacent gas conduit and also to provide cost effective fabrication of the separators.

10. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Allen (US 6777126) in view of Marianowski et al (US 4963442) as applied to claims 8-12 above, and further in view of Akikusa et al (JP 2002-280007). However, the references do not expressly teach at least two sheet metal elements that are constructed of a

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chromium-nickel austenitic alloy comprising on a combined basis at least about 50% by weight chromium and nickel. The Akikusa reference teaches a fuel cell separator "33" that is constructed of nickel radical alloy or chromium radical alloy such as Inconel 600 which is a chromium-nickel alloy comprising 72% nickel and 14 to 17% chromium (See paragraph [0029] and Inconel 600 Technical Data). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Allen bipolar separator to include at least two sheet metal elements that are constructed of a chromium-nickel austenitic alloy comprising on a combined basis at least about 50% by weight chromium and nickel in order to provide a high temperature alloy that has an excellent combination of high strength, hot and cold workability, and resistance to corrosion so that it is able to withstand the corrosive environment of a high temperature fuel cell.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571) 272-0717. The examiner can normally be reached on M-F, 8:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for


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published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC



RAYMOND ALEJANDRO
PRIMARY EXAMINER